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ABSTRACT

A project assessed perceptions of manufacturing employers regarding the workplace literacy skills of occupational groups in their industry in Manitoba. A mailed survey was sent to 125 members of the Canadian Manufacturers' Association; 41 completed it. The first part of the survey obtained information about the occupations in manufacturing and required reading, writing, math, and communication skills. The second part gathered employers' perceptions about workplace literacy skills and occupational groups most in need of improved basic workplace skills and determined if they were interested in a further initiative to examine workplace literacy skills. Two-thirds of the respondents identified 9 of 10 common industrial reading documents/tasks as occupational reading tasks. The most common mathematics operations were working with decimals, using metric measurement, and working with fractions. Two-thirds of the respondents used tape measure, calipers, micrometer, and scales. Half of the respondents identified all four types of writing: work orders, complete forms, time cards, and safety reports. All respondents stated listening speaking were used. English as a second language was a concern for 16 companies. Of 41 industries completing the survey, 23 indicated an interest in participating in a further initiative. (Appendixes include the survey, occupational groups needing improved workplace literacy skills, and list of participating companies.) (YLB)

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Basic Education in the Workplace Exploratory Project
Canadian Manufacturers' Association

Perceptions of Workplace Literacy Skills in Manitoba's Manufacturing Sector

Final Report

by
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Workplace Literacy Consultant

March 1993

U.S. DEPARTMENT OF EDUCATION
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CE 068 989

Basic Education in the Workplace
Steering Committee 505-138 Portage Avenue East, Winnipeg, Manitoba R3C 0A1

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INTRODUCTION

This report describes the Basic Education in the Workplace Exploratory Project undertaken by the Canadian Manufacturers' Association of Manitoba (CMA). The funding for this project was provided by the National Literacy Secretariat through the Manitoba Basic Education in the Workplace Steering Committee.

The project was designed to assess:

a) the perceptions of manufacturing employers regarding the workplace literacy skills of occupational groups in their industry and

b) their interest in participating in a further project.

On the basis of the results of this project, the CMA Basic Education in the Workplace Steering Committee would make a decision whether or not to proceed with a further initiative and if so, would define the parameters and goals of that project.

PROJECT OBJECTIVES

The project objectives were:

- Promote awareness of workplace literacy in the manufacturing sector in Manitoba,
- Design an instrument to assess the perceptions of workplace literacy skills for common occupations in the manufacturing sector,
- Assess employers' perceptions of the need for workplace literacy skills,
- Assess the interest in a further investigation of workplace literacy skills, and
- Develop a proposal for further study, if warranted.

SURVEY DEVELOPMENT

To gather the perceptions and determine the interest, a mail out survey, developed for this project, was sent to members of the CMA. A copy of the survey may be found in Appendix 1.

The first part of the survey was designed to obtain information about the occupations in manufacturing and the reading, writing, math and communication skills required by these occupations.

The second part of the survey was designed to:

1) gather employers' perceptions about workplace literacy skills in general,

2) gather perceptions about the occupational groups in manufacturing most in need of improvement of basic workplace skills,

3) determine if any employers had participated in workplace literacy skill assessments, and

4) determine if there was sufficient interest in a further CMA initiative to examine workplace literacy skills in the manufacturing sector.

SURVEY RESULTS

Return Rate

One hundred and twenty-five (125) CMA members received the survey and 41 completed it, for a return rate of 33%.

Occupations in Manufacturing Industry

The most common occupations were:

- Material Handler (32),
- Machine Operator (31),
- Machinist (21),
- Industrial Mechanic (20), and
- Welder (20).

However, if the occupations of Lathe Operator (15) and Brake Operator (8) were included in the Machine Operator category, this would be the most common occupational group. The results are presented in Table 1.

Other common occupations added by the respondents included: Shipper/Receiver (5), Industrial Electrician/Electrician (5), Spray Painter/Painter (4), and Machine Grinder (2). A full list of other occupations is found in Appendix 2.

Table 1 Occupations in the Manufacturing Industry

Occupation	Number	Occupation	Number
Material Handler	32	Lathe Operator	15
Machine Operator	31	Millwright	13
Machinist	21	Sheet Metal Operator	13
Industrial Mechanic	20	Fabricator	12
Welder	20	Tool & Die Maker	10
Assembler	17	Instrument Technician	10
Mechanic	16	Brake Operator	8

Reading Skills

The survey listed 10 common industrial reading documents/tasks. Of these, all but code books were identified by two-thirds of the respondents as occupational reading tasks. The results are presented below in Table 2.

Other types of workplace reading added to the list by respondents were :

Formulations,
Shipping Picks,
Process Control Checklists,
Bills of Material,
Process Set up Sheets, and
Process Instructions,
Material Safety Data Sheets,
Schematics,
Specifications,
Service Bulletins.

There were two additional comments provided by respondents:

- Memos, Product Schedules, Manuals and reports do not currently go to shop floor due to skill limitations on shop floor.'
- 'Not all of the above jobs require all of above reading tasks.'

Table 2 Workplace Reading Documents/Tasks

Reading Document/Task	Number
Safety Regulations	37
Work Orders	36
Forms	34
Memos	33
Blueprints	32
Manuals	31
Diagrams	31
Product Schedules	27
Reports	24
Code Books	13

Mathematics

The survey presented a list of 10 common mathematical operations in manufacturing. The results are presented in Table 3.

The most common operations were : working with decimals (31),
using metric measurement (30), and
working with fractions (23).

A number of additional mathematical operations were added by respondents. These are presented in Table 4.

Mathematical Instruments

All four of the mathematical instruments presented in the survey were used by two-thirds of the respondents: Tape Measure (35), Calipers (31), Micrometer (30), and Scales (28).

Other Mathematical Instruments added by respondents are presented below.

- Computers (3)
- Digital/Electronic Read outs (2)
- CNC Controlled Machines
- Electronic Testing Equipment
- Fitting Jigs and Fixtures
- Protractor
- Vernier Scales
- Calculators (2)
- Gauges (3)
- Computer Programs
- Angle Measuring Instruments
- Meters
- Shadograph

Table 3 Type of Mathematical Operations			
Operation	Number	Operation	Number
Decimals	31	Volume	17
Metric	30	Area	16
Fractions	23	Estimation	16
Angles	19	Circumference	14
Cutting Speeds	18	Perimeter	13

Table 4 Other Mathematical Operations	
Length (2)	Weight Totals (2)
Arithmetic Totals	Bend Allowance
Calculation of Time Consumed	Estimation of Completion of Jobs
Feed Rates	Flows
Formula Proportions	Lefts, Rights
Materials Required	Operating Rates
Opposite Hand	Percentages
Simple Addition and Subtraction	Simple Math
Shear Sizes	Statistics - Basics
Tolerances	Width

Communication Skills

There were two questions concerning communication skills; one for writing and one for oral and visual communications.

Writing

All four types of writing presented in the survey were identified by half of the respondents: Work Orders (29), Complete Forms (27), Time Cards (27), and Safety Reports (18).

Other writing skills added by respondents are presented below.

- Log Book Entries (2)
- Core Sheets
- Inventory Tags
- Pouring Sheets
- Production Reports
- Summary Reports (Production/ Job)
- Change Orders
- Instruction Clarification
- Non-conformance Reports
- Production Travellers
- Quality Checks
- TQM Proposals

Listening and Speaking — *All* respondents stated these two skills were used in manufacturing occupations.

Hand Signals: — These were used in 5 companies

English Second Language — This was a concern for 16 companies.

Other Communication Skills

Other points added by respondents in the communication category included:

- Writing (3),
- Ability to Work as Team Member (2),
- Clarity of Communication, and
- Reading Instructions (2),
- Computer Literacy,
- English as a First Language.

Occupational Groups Most Needing Improvement in Workplace Literacy Skills_

In the survey, the companies were asked to identify the occupations in their industry which were most in need of improvement in Workplace Literacy Skills. Specific company perceptions may be found in Appendix 3. The general results are presented below in Table 5.

Table 5 Occupations Needing Improved Workplace Literacy Skills

All Manufacturing Occupations	8	*Unknown/Not able to Identify*	3
Specific Occupations	16	*Specific Worker Groups*	5
Sheet Metal Workers	(2)	Occupations with Minority Workers	(3)
Welders	(2)	English Second Language Workers	(2)
CNC Machine Operators	(2)		
Machine Operators	(2)		
Mechanics	(2)		
Quilters and Sewers	(1)		
Assemblers	(1)		
Material Handlers	(1)		
Painters	(1)		
Heat Treators	(1)		
Platers	(1)		

Perceptions of Need for Improvement of Workplace Literacy Skills

The general perception was that increasing demands are being placed on workers due to the impact of technology and the need to produce products to compete in today's market, both locally and globally. Specific company perceptions may be found in Appendix 4. The general results are presented in Table 6.

One comment was added to the survey about training and workplace literacy skills:

- "Employees need to be trained to become proficient at learning new skills on their own. If we train in specific skills applicable to their current job - we will be training employees over and over again as their jobs change."

Table 6 Perceptions of Need for Improvement of Workplace Literacy Skills	
Category	Number
Need To Improve Basic Skills	12
Require Improvement	8
Need Grade 12	6
High School Math	3
Grade 11	2
Too Low For The Demands	3

Past Workplace Literacy Skill Assessments

Nine companies had undertaken some form of workplace literacy needs assessment. Of these companies, five were conducted under the auspices of the Workplace Language Training funded by Employment and Immigration Canada and delivered through Manitoba Education and Training. Two assessments were conducted on an informal basis within the company. One was conducted by Northern Alberta Institute of Technology (N.A.I.T.) through the company's head office in Edmonton. The last one was conducted by Keewatin Community College for employees with ESL needs at the company. The companies indicated they were willing to share the data gathered through these needs assessments, with the exception of the one conducted by N.A.I.T.

Industries' Interest in Further Study

Of the 41 industries completing the survey, 23 indicated an interest in participating in a further initiative; 13 were not interested; 3 might be interested and 2 gave no response. This indicated there was sufficient interest to undertake a further initiative.

PROJECT OUTCOMES

- ✧ Through the covering letter and the survey for this exploratory initiative, awareness of workplace literacy skills within the manufacturing sector in Manitoba has been increased.

- ✧ An instrument to send to employers to gather their perceptions about workplace literacy skills has been developed. The instrument has since been adapted for use in another sector.

- ✧ Workplace literacy skills are needed by occupations in the manufacturing industry.

- ✧ Based on the information received from the respondents, it may be stated that the workplace literacy skills of reading, writing, mathematical operations and tools, and oral communication are fundamental occupational skills in the manufacturing sector in Manitoba.

- ✧ There was sufficient interest on behalf of employers to pursue a further, in-depth study of workplace literacy in the manufacturing.

RECOMMENDATIONS FOR FURTHER INITIATIVE

- ✧ A study of workplace literacy skills in the manufacturing sector be undertaken.
- ✧ Clarification of the difference between basic skills and Grade 12 be conducted.
- ✧ Limit the study to the occupational group of machine operators.
- ✧ A wide a range of industries be included in the study.
- ✧ The study include industries outside of the Winnipeg perimeter.
- ✧ The study include industries of different sizes.

Based on these recommendations, the CMA Basic Education in the Workplace Steering Committee submitted a proposal the Manitoba Basic Education in the Workplace Steering Committee to undertake an analysis of the workplace literacy skills of machine operators in the manufacturing sector. The goals of this initiative are:

- ✧ To identify the variety of occupations included in the machine operator category.
- ✧ To identify the workplace literacy skills, reading, writing, math, and communication skills, needed to carry out the duties of machine operators.
- ✧ To establish a profile of the most common/core workplace literacy skills of machine operators.

APPENDICES

Appendix 1

CMA Manitoba
Workplace Literacy Skill Survey

Company Name : _____

Contact Person : _____

Total Number of Employees: _____

1. Please check the manufacturing occupations operating in your company.

Assembler	___	Brake Operator	___	Fabricator	___
Industrial Mechanic	___	Instrument Technician	___	Mechanic	___
Lathe Operator	___	Machinist	___	Millwright	___
Machine Operator	___	Material Handler	___	Welder	___
Sheet Metal Worker	___	Tool and Die Maker	___		

2. Please list any other manufacturing related occupations in your company.

_____

_____

3. What type of reading is required in these operations ? (Check all that apply.)

Blueprints	___	Code Books	___	Diagrams	___
Forms	___	Manuals	___	Memos	___
Reports	___	Product Schedules	___		
Work Orders	___	Safety Regulations	___		

Other : ___ Please Specify : _____

_____

4. What type of writing is required in these operations ? (Check all that apply.)

Complete Forms	___	Safety Reports	___
Time Cards	___	Work Orders	___

Other : ___ Please Specify _____

_____

5. What math is required in these operations ? (Check all that apply.)

Fractions	___		Decimals	___			
Metric	___		Estimation	___			
Calculation of:	Area	___		Perimeter	___	Circumference	___
	Volume	___		Angles	___	Cutting Speeds	___

Other : ___ Please Specify _____

_____

6. What tools or equipment needing Math skills are used in operations?

Calipers ____ Micrometers ____

Tape Measures ____ Scales ____

Other : ____ Please Specify _____

_____

7. What communication skills are required by these occupations? (Check all that apply.)

Listening ___; Speaking ___; Hand Signals ___; English Second Language ___

Other : ____ Please Specify _____

_____

8. What are your perceptions of reading, writing and math skills needed in the manufacturing industry? (Use additional paper, if necessary.)

_____

_____

_____

9. Which occupation groups are most in need of improved reading, writing and math skills?

_____

_____

10. Has a workplace literacy skill assessment ever been conducted in your company ?

No ____ Yes ____ If Yes, please specify when and who conducted it.

_____

_____

Would you be willing to share this information with the CMA ?

Yes ____ No ____

11. Would your company be interested in participating in a CMA initiative to identify the workplace literacy skills required by various occupations in the manufacturing industry?

Yes ____ No ____

Contact Person (if different than above): _____

Thank you for taking the time to complete this survey.

PLEASE RETURN THE SURVEY BY MAIL TO:
THE CANADIAN MANUFACTURERS' ASSOCIATION
402, CENTURY PLAZA, ONE WESLEY AVENUE
WINNIPEG, MANITOBA R3C 4C6 **OR** BY FAX : (204) 943-3476

Appendix 2

Other Occupations In Manufacturing Sector as Provided by Respondents

Agriculture Research
CNC Punching Machine Operators
Cut to Length and Shear Operators
Electricians
Fork Lift Operator
Furnace Operator
Grain Cleaner
Heat Treator/Chrome Plater
Inspector
Machine Grinder
Metallizing (Proprietary Process)
Packager
Pourer
Process Management
Production Operations
Roll Formers
Sewing Machine Operator
Spray Painter/Painters
Tool Design & Process Design
Butcher
Core Maker
Die Polisher
Electronics Technician
Formulator
General Labourer
Group Leaders
Industrial Electrician/Electrician
Inventory Control
Maintenance Personnel
Moulder
Pattern Maker
Power Engineers
Process Operator
Programmer CNC Equipment
Saw Operators
Shipper Receiver
Thermal Spray Operator
Vinyl & Silicone Moulding

Appendix 3

Occupational Groups Needing Improved Workplace Literacy Skills

Company	Occupational Groups
1	Machine Operator level require improved skills. Other levels receive the skills through their training
2	Lower skilled jobs which also contain highest percentages of immigrants.
3	General factory workers and supervisors in general have poor skills.
4	All occupations involved in manufacturing.
5	Entry level groups. Technical groups generally have acquired that knowledge to acquire the certification.
6	Basic entry level, primary level line employees.
7	Not able to identify
8	The non-apprentice occupations
9	No single group can be identified; all groups share similar degree of need.
10	Unknown in our organization; No specific problem
11	All groups in today's market.
12	Sheet metal worker; Assembler.
13	No particular group. In today's workplace, everybody needs to be able to communicate verbally as well as in writing.
14	Unknown
15	Based on our needs assessment, all areas of the workplace feel a need for improved skill in communication (reading, writing, math)
16	Entry Level staff.
17	Our employees appear to have sufficient knowledge of these skills to deal with their jobs. Shortfall is coming up with new ideas to improve workplace, product and equipment.

Appendix 3

Occupational Groups Needing Improved Workplace Literacy Skills Continued

Company	Occupational Groups
18	Trades and processing groups.
19	Unskilled workers.
20	In our company, machine (pultoversion) operators are the most in need.
21	Most occupations using minority group workers.
22	All operations would benefits from improvement.
23	Quilters, Sewing
24	Technicians: Mechanics and Material Handlers
25	Production staff - ESL; Everyone - Statistical.
26	Within our organization, the Welding Department employees
27	All employees need blueprint reading skills, but especially sheet metal workers and welders. Painters require reading skills for application instructions. CNC machine operators require basic computer skills (e.g. keyboard)
28	Company trained N/C Operators.
29	Production line workers (process operators, grain cleaners, warehousemen)
30	The Manufacturing Area.
31	Machine Operator - in general unskilled labour; Industrial Mechanics, Machinists, Heat Treators, and Platers.

Appendix 4

Perceptions of Workplace Literacy Skills Needed in Manufacturing Sector

Co.	Perceptions of Workplace Literacy Skills Needed
1	Basic reading, writing and math skills are required by the Machine Operator level (Grade 12)
2	Requirements range from basic English and simple arithmetic to fairly sophisticated levels for trades and office
3	People tend to rely on computers, calculators, however the basics come first.
4	Basic reading, writing and math are needed in industry today, a warm body is no longer enough.
5	Grade 12 or equivalent, due to the strict regulations that govern our industry
6	Clear understanding of English Oral /written. Basic problem solving; Using addition, subtraction, division and multiplication.
7	To operate the "new operation machines", efficiently, high school math should be a requirement.
8	Need working knowledge of reading, writing and math skills.
9	We believe that literacy and numeracy skills are lacking due to second language and educational background.
10	Basic Grade 12
11	All are highly important.
12	In order to produce a superior product, reading, writing, and math skills are the very basics required for communication within an informed company, and are extremely necessary to achieve these goals, both on a domestic and global basis.
13	All skill levels must be upgraded to compete effectively in today's market.
14	Lower than required.
15	Actual study would be required - perception is Grade 12 +
16	Essential - Reading/understanding - Standards/ops policies/safety policies
17	Grade 11 level.
18	Increasing at a rapid pace as companies transfer more of the day to day management over to those closest to the process.

Appendix 4

Perceptions of Workplace Literacy Skills Needed in Manufacturing Sector Cont'd

19	There is a lack of basic literacy and math skills among entry level staff in manufacturing.
20	With the rapid increase of technology, operators need to upgrade in all above skill areas. We need to train our people more and they need the basic educational skills as a foundation.
21	Grade 12, English, Math, Computer literacy
22	All skills are required for communication between employees and employer to produce the best product with the most efficiency.
23	Skills are basically minimal. They are in need of upgrading somewhat, - not necessarily a huge upgrading, - but an upgrading nevertheless.
24	Ability to read (& understand) technical documents requires improvement.
25	The skills needed are generally a lot higher than most people possess. Skill levels are far too low on average.
26	Basic Skills to meet current and future needs particularly technical related.
27	It is generally accepted throughout our operation that all would benefit from improvements in the reading, writing and math skills.
28	Employees should have the basic skills necessary for these activities.
29	Reading Comprehension and basic math skills are lacking
30	Increasing needs - understanding and being able to actively participate in team effort is essential.
31	Our skills in the type of work done is satisfactory. However reading, writing, and math skills would give a greater advantage.
32	To become active participative members, staff require Grade 12 skills. Most employees don't have this skill due to lack of training or inability to recall training. Math is critical.
33	Need spelling , grammar and vocabulary to communicate effectively. Writing must be legible. Math must include percentages and statistics.
34	In rural areas, many of the labour type jobs applicants have weak skills
35	With technology advancing, higher math skills are required to operate the High Tech Machinery with computer applications.

Appendix 5

Companies Participating in CMA Survey

Alcatel Telecommunications Cable
Ancast Industries Ltd.
Argus Industrial
Atlas-Graham Ind. Co. Ltd.
Brovail LifeSciences
Burns Meats
Canada Post Corp. MidWest Div.
Canadian Bronze Co. Ltd.
Canadian Metal Co. Ltd.
Canadian Oxy.
Carte International Inc.
Century Steel
Coca Cola Bottling
Controlled Environments
Custom Steel Mfg. Ltd.
Dominion Bridge
E.H. Price Limited.
Fiat Products Ltd.
Griffin Canada Inc.
International Game Technology
Inventronics Limited
KT Industries
Labatt Manitoba Brewery
Loewen Windows
Manitoba Honey Producers Ltd.
Manitoba Rolling Mills
Manitoba Sugar Company
Melet Plastics Inc.
National Coating Technologies Inc.
Omniglass Ltd.
Otto Bock Orthopedic Industry of Canada Ltd.
Repap Manitoba
Simmons Canada
Standard Aero
Temro Division. Budd Canada Inc.
The Royal Canadian Mint
Triple E Canada Ltd.
Wardrop Consulting
Westeel
Westroc Ind. Ltd.
Woodstone Food Corporation